THE DEVELOPMENT AND TRIAL OF A TECHNOLOGY PEOPLE ENVIRONMENT MODULE WITH SELECTED 9th GRADE STUDENTS

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Bachelor of Science

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New Orleans, Louisiana

1972

Submitted to the Faculty of the Graduate College
of the Oklahoma State University
in partial fulfillment of the requirements
for the Degree of
MASTER OF SCIENCE
December, 1975

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ACKNOWLEDGMENTS

I acknowledge my sincere appreciation to the many people who have given of their time and expertise to make this effort possible. Dr. Thomas Johnsten served not only as my supervising professor, but also as Director of the Southwest Regional Center for The Man Made World, whose resources provided the graduate assistantship that made my study possible. Dr. Dan Selakovich and Dr. Kenneth King, the other members of my advisory committee were always willing to assist me in the development of the materials used in this study. I also thank Mr. Clifford Francis for allowing me to use his school and Miss Wanda Harris for the use of her classroom.

A special note of thanks is extended to Dr. Tom Liao and Dr. E. J. Piel who made it possible for me to become involved in the revision of the Technology People Environment Program. To both I am deeply indebted for a truly rewarding experience.

Finally, my deepest gratitude is extended to my mother, Mrs. Charles Durr, for the encouragement she has given for me to continue my studies and to my children who have done without much of the tender loving care they deserve and to the students of McDonogh #35 Senior High School who were my inspiration.

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DEFINITION OF TERMS

1. ECCP - ENGINEERING CONCEPTS CURRICULUM PROGRAM, Headquarters Suny at Stonybrook, New York. Executive Director, Dr. E. J. Piel, Developers of the Huntington II Project, The Man Made World, and Technology People Environment Programs.

2. Uninvolved student - a student who for one of many possible reasons is not achieving at grade level.

3. Technology People Environment (TPE) - Activities approach to The Man Made World.

4. Mini-course - a block of student materials designed to be taught over a period of time varying from 4-6 weeks. For the purpose of this study three days of activities were used.

5. Student activity sheet - a predesigned sheet on which the student answers questions and records data. These sheets are kept by the students as a record of completed work.

6. Evaluation instrument - method of determining the student's achievement of the lesson objective. TPE evaluation instruments are one question items designed to test the student's achievement of the performance objective.

7. Teacher's guide materials - Teaching suggestions provided as an assistance as part of the published materials furnished. Includes lesson objectives, strategies, sample responses for student activity sheets, references, audio-visual materials, and the evaluation instruments.

CHAPTER I

GENERAL STATEMENT OF THE PROBLEM

Introduction

The Technology People Environment Program, a development of the Engineering Concepts Curriculum Project, is based on the premise that academically uninvolved students should learn about the interaction of technology and people to avoid the condition of "future shock", which occurs when one is confronted with the situation that the world for which they were educated no longer exists. The T P E Program attempts to develop technological literacy by matching learning goals and techniques of instruction to the needs of these poorly motivated students.

The Technology People Environment mini-courses develop a generalized systems approach for the interactions between technology, people, and their environment. The original version of the program consisted of eight mini-courses multi-disciplinary in structure and incorporating the use of multi-media techniques.

Background Information

During the 1973-74 school session, the T P E Program was pilot tested in classes of various student achievement levels and with students of varying socio-economic and ethnic backgrounds. Using feedback obtained from the pilot study, the mini-courses were revised during the summer of 1974 by a team of teachers and ECCP staff members. These

revised materials are presently being tested in the classroom. The decision has been made by project directors to increase the number of mini-courses, providing extension materials for the course. Two new mini-courses have already been completed, and others are in the planning stages.

Statement of the Problem

The study included designing a mini-course activity for use in the T P E Program and teaching the activities, enabling the materials to be evaluated for effectiveness in actual classroom used.

Methodology

The mini-course was taught in a high school where students are tracked by achievement levels. It was taught in accordance with the model established by precedence in successful T P E classrooms. The evaluation instruments were designed to test student accomplishments of the individual concepts as stated in the objectives of each activity. The aim of the study was to determine the degree of success of each activity as reflected by student performance on the evaluation instruments.

Component parts of the mini-course designed for use in the study included:

(1) Front matter (rationale, objectives, systems concepts, materials, equipment, daily references).

(2) Illustrated student activity sheets.

(3) Teachers guide material.

(4) Audio-visual materials (slide tape introduction, transparencies) and

(5) Evaluation package (evaluation instrument for every activity based on the stated objectives for the activity).

CHAPTER II

REVIEW OF THE LITERATURE

Introduction

The development of a new program of studies requires consideration of expertise from many areas. Of primary importance are the content, method of presentation, level of students to use the materials, and the needs of the students as determined by the conditions of society.

This review will cover topics pertinent to the development of the Technology People Enrivonment Program, and the students the program is designed to be used with.

One way to get students to master the future is to give students the tools to understand the technology that shapes the future: not just what technology does for us, but what it does to us. The suggestion that machines may not always be benevolent is heresy in the United States. An indictment of the machine and its work does exist, and we can find many examples in both fiction and non-fiction if we choose: Brave New World (Harper & Row), 1984 (NAL/Signet), The Children of Frankenstein (Indiana University Press), the last describing the impact of technology on many American institutions (30).

The attack on machines and technology is complex, but simply stated, the main idea is that we have been robbed of freedom and humanity and even enslaved by the machines which we have created to serve us. Society has become a machine, with man only a cog, his future

depending upon symbiosis with his mechanical masters.

After being presented with the indictment, few students will be willing to believe that there is any wrong with a technological world. Most of their lives they have been surrounded by beneficient machines and an anti-technology stand would involve changing attitudes toward cars, motorcycles and sound systems (14).

One problem is the speed of technological innovation--its exponential growth rate. In his book Future Shock, Alvin Toffler describes the results of the overload which results from the pace of change and constant confrontation with the new (28). Students can grasp the concept of future shock when it is explained in terms of stress and its effects.

Many students have experienced decisional stress and its effects. Once the students can become aware that change does not necessarily mean that one will be better off, it becomes easier for the students to question the American belief that change means progress.

Another aspect of the impact of technology which must be considered is predictability as changes springing from innovation are not always predictable. Speculation on life in the United States minus several important inventions can accomplish an understanding of this concept--for how could we possibly picture the 1970's minus portable radios or King car.

To solidify the students' awareness of the way our lives are shaped by machines demands we look directly at the impact of machines on our own lives. What wakes us up, cooks our food, tells us when to move from place to place and then moves us? How long will it be until machines completely dehumanize us? The question as to whether or not

machines can be made human causes technological waters to get murky. An excellent example of consequences of an unpredictable innovation is the fictional novel 2001: A Space Odyessy (NAL/Signet) when a computer becomes virtually human (29). Computers capable of conquering the world may be just a step or two away, and some students will still regard the idea as fantastic and reject the idea completely. The answer is to seize control of technology and bend it back to service human needs.

Problems are inherent in life in a technological world. Benefits of technology are strong for the educated knowledgable individual, but the net effects for the citizen separated from the social system are likely to be negative. There is difficulty implementing a satisfactory technological system when most of the public is totally unaware of how it operates. There is a need for public understanding if political and social decisions are to be made more intelligently and for the improvement of the quality of life (29).

Technological literacy spans the range from how specific devices or machines work to the understanding of the complex systems which provide social needs. Technological literacy includes not only the scientific principles underlying the devices and systems, but also the social, political, economic, and human impacts. Technological literacy requires the transfer of knowledge among the classical educational areas: natural, life, social, and behavioral sciences, humanities and fine arts, and the professional fields of engineering, law and medicine.

While technological literacy might be considered an appropriate element of the educational objectives for all ages, there are certain target audiences where significant opportunities now exist for

educational research and development. The youngest of these groups to be considered would be minority and culturally disadvantaged students in grades 7-12. In the early years, the anti-science attitudes develop, with the consequence that only a small percentage of today's engineers are Black, and there are only a negligible amount from other minorities with the exception of Orientals. The aversion of minority and culturally disadvantaged students to science and technology is a serious attribute of the technological era. Part of the problem may be the irrelevance of much of the science teaching. The appropriate mechanism for delivery of education for technological literacy depends on the audience. Activities must be presented in a style and format with demands upon the student consistant with the students' background, other demands and life style.

Reaching a goal of technological literacy requires a long term national effort, hopefully led by the National Science Foundation and involving other agencies.

The Man Made World is a program of studies designed to increase technological literacy among non-science high school students (23). The reading level of The Man Made World and the math concepts involved were too difficult for minority and culturally disadvantaged students in grades 7-12, who have already been identified as a target group of importance in the development of technological literacy. For this reason the Engineering Concepts Curriculum Project has developed the Technology People Environment Approach to the Man Made World. By using classroom activities involving hands on experiences and using the involvement of the students in realistic experiences it is possible for these students to become familiar with basic technological concepts.

According to Ausubel (1), curriculum that takes the readiness of the culturally deprived child into account, takes as its starting point his existing knowledge in the subject area and intellectual skills, no matter how low this level may be. This policy demands elimination of all subject matter that he cannot assimilate on the basis of current level of cognitive sophistication. In many urban high schools and junior high schools, pupils who cannot read at a third grade level are subjected to irregular French verbs and geometrical theorems.

A second consideration for effective strategy is to assure mastery of on-going learning tasks before new tasks are introduced, so as to provide necessary foundations for new sequential tasks to follow.

> The great resevoir of undiscovered talent is not in upper-class or middle-class neighborhoods. While the proportion of high I.Q.'s may be lower in middle-class neighborhoods, the actual numbers of intellectually very bright children in poor homes are far in excess of those to be found in the relatively few homes of business and professional leaders. What is needed now is some fresh approach to the discovery and cultivation of the talents that undoubtably exist among children from unpromising backgrounds (30, foreword).

Several studies considered controversial in this area appeared in the decade of the sixties.

The Negro Family, The Case for National Action (better known as the Moynihan Report) was written as an effort to justify the intervention of the federal government in civil rights and poverty. Focus was mainly on the problems of the black family.

J. S. Coleman and other social scientists were commissioned by the federal government to conduct the study Equality of Educational Opportunity (21). The report set out to show that school facilities of minority children were unequal, and this inequality was related to student achievement (21). The outcomes did not support the intent, but

rather the major findings were:

(1) Schools are similar in the effect they have on student achievement.

(2) Student achievement is mainly related to family characteristics.

(3) Minority children are more affected by the schools characteristics (teachers, facilities, resources) than middle-class children.

Jensen's article, "How Much Can We Boost I.Q. and Scholastic Achievement", rekindled the emotional issues of race, intelligence and heredity. The article aroused much controversy mainly because of the prominence of the author and because it was published by Harvard (15).

The Socially or Economically Disadvantaged Child

The socially and economically disadvantaged child represents one of the greatest domestic social problems that must be dealt with today (6).

We must consider the term socially disadvantaged as a relative term implying that the individual has a disadvantage relative to some other child for some kind of social life. The socially disadvantaged child is handicapped in relation to growing up to lead a competent and satisfying life in American Society. The writer has included "economically disadvantaged," as a definite relationship often exists between socio-economic status and social disadvantages of children. Not all socially disadvantaged children come from poor families, and not all lower income families produce socially disadvantaged children. Havighurst (6) places the number of socially disadvantaged children in this country at 15% of the child population and estimates that 30% of the children living in major countries fall into the disadvantaged category. Havighurst described the underlying causes of socially disadvantaged children as group

characteristics. Socially disadvantaged children are:

(1) At the bottom of American Society in terms of income.

(2) Have a rural background.

(3) Suffer from social and economic discrimination at the hands of American Society.

(4) Are widely distributed in the United States, most visible in big cities, present in all except very high income communities, are found in equal concentration in rural areas.

In racial and ethnic terms, Havighurst (6) views these groups as about evenly divided between whites and non-whites, and consisting mainly of:

(1) Blacks from the rural South who have migrated to Northern industrial cities.

(2) Whites from the rural and mountain South who have migrated to Northern industrial cities.

(3) Puerto Ricans who have migrated to Northern industrial cities.

(4) Mexicans with a rural background who have migrated into the West and Midwest.

(5) European immigrants with a rural background from Eastern and Southern Europe.

Curriculum modification for disadvantaged children involves creating instructional materials that are challenging and interesting. The bland middle-class oriented traditional programs are often poorly suited. New materials which present clearly recognized experiences and focus on problems of everyday living, such as how to make sound purchases or apply for a job can be more meaningful. The disadvantaged population is representative of a critical social dilemma facing the entire American society today (6).

Though the Emancipation Proclamation was signed more than 100 years ago, black people as a group are still ensnared in the bonds of cultural

deprivation. About 2/3 of the black population is entrapped in cycles of economic poverty and illiteracy. Literacy among American blacks is a comparatively recent thing, and many black children do not acquire a positive attitude toward education.

As a group, blacks lead in almost every area of social pathology--broken homes, illegitimacy, delinquency, crime and school dropouts. Efforts to save them from social defeat are hampered by racism. Blackness has made their exclusion easy. Blacks are prevented from participation in the dominant culture because of their race. Middle-class blacks are having the doors opened for them--in this area the dominant culture is widening. Jobs with the crafts are still closed.

Education can be the passport to participation in the dominant culture. Already blacks constitute 50% of the public school population in major cities. Many of these blacks are culturally disadvantaged.

In 1900, 90% of the black population lived in the South--80% in rural areas. In 1960, 73% of the blacks lived in urban areas, according to the United States Census Bureau. In the big cities of the North, education of blacks is most acute. The larger the city, the greater the chance that a black student will go to an all black school--causing further isolation from the dominant culture group (11).

"In planning learning experiences for children, let's stop talking about deficiencies and instead recognize the use of strengths"(18, p. 24).

Many educators today are beginning to recognize that they have been short changing black Americans. Teachers and administrators continue to harbor strange beliefs due to the effects of racism on our educational system. These beliefs are perpetuated by the special relationship which continues to exist between blacks and whites as evidenced by separate

communities, different ways of life, and different perspectives on what the world is like.

What may have been overlooked in the repertoire of teacher knowledge is an understanding of the strengths that the black child brings to school. It could be that the experts were unaware of the existance of these strengths, or they felt the strengths without value.

Negative attitudes toward the deficits theories resulted in the development of their own approaches to education by the blacks in order to find a better way to motivate their children. These approaches stress the cultural strengths of the black child growing out of the positive features of black life. Out of this movement came the "Black is Beautiful" concept and the self-identity theme.

A black child growing up in our educational system must first recognize his own blackness and all of the implications of that fact. From the day he first understands this it will influence his every thought and emotion.

There is much diversity in black culture and in black children within the black culture, though there are some things common to the black experience. America has not applied the concept "love thy neighbor" to minority groups. There is no black poetry which does not present a struggle.

The first of the strengths of the black child is resourcefulness. Many black children are called upon to do things never expected or experienced by whites. Many young blacks are expected to care for young children, go to the grocery store, prepare their own food, and obtain and care for their own possessions. Resourcefulness is certainly consistent with the educational goals of today--it is what good teachers

try to develop.

Black children also go to school with an inborn spirit of competitiveness, for when the black child does not get what he wants, he starts all over again from nothing--find an alternative goal. Good teachers will build on this spirit in black children, and by giving individual praise and offering alternate solutions to problems we can build on this black strength.

Still another strength of the black child is realism, for the daily routine of black children contains many crises and defeats. If he is shown that he can win, that he can be successful, he can be easily motivated. These children have unique abilities for coping with unexpected situations.

A fourth strength of the black child is pride and dignity. He is sure there is a beauty about blackness which does not have to do with the color of his skin. This combined with heritage, which for so long was just a "dark continent", contributes enormously to black pride. By helping students to develop a strong sense of identity, teachers could help students to point proudly to their past.

It should be noted that teachers must recognize and learn to work with these cultural strengths of black children, for they already possess, possibly in a hidden way, the values we are trying to develop with modern education.

Four major ethnic groups combine with the black American to comprise virtually the total disadvantaged population: Mexican Americans, Puerto Ricans, Appalachians and Southern rural whites are like the blacks in that they are members of a subculture that will not prepare them for entrance into the dominant culture. The subcultures of

Mexican Americans, Puerto Ricans, and American Indians does not mean the same thing as when applied to the other groups, for their subcultures are not derivatives of the dominant culture, but rather products of completely different cultures. They are really culturally different, and the difference between their culture and the dominant American culture makes them disadvantaged (11).

There are basically two types of programs used in teaching the culturally disadvantaged: compensatory programs try to make up for the deficiencies in the background of the culturally disadvantaged children and the second type which uses content methods and materials based on the pupils background. Both types of programs may be called compensatory programs, and both have the same purpose, to improve the level of the disadvantaged child.

Compensatory programs attempt to make up for the deficiencies in the student's background so he can achieve--that is to provide the necessary experiences so he can achieve on the level of a middle-class white child, an example is the Headstart Enrichment Program. The second type of program uses the child's cultural background as a take-off point for instruction, using content that especially interests culturally disadvantaged students. For example, a program may include study of social problems relevant to the students.

Programs designed for culturally disadvantaged groups should differ from programs designed for middle-class whites only in structure and approach, but not in goals, for the overall objectives of education are the same for both groups (11).

It is painfully evident that our urban schools are caught in an accelerating cycle of decline. Since urban schools will constitute the

majority of schools by the end of the 1970's we are talking of a decline in American education.

Cities are paying a heavy toll for the decline in educational quality - economic, political and social and cultural life is being directly affected. Business and industry is leaving the cities, one of the chief reasons being the poor quality of education received by graduates of the urban schools. The decline has begun to trigger a loss in public confidence in the schools. The most tragic failures are occurring in areas where education is needed most desperately, the low income areas.

As an urbanized society, we are increasingly dependent on a modern education system for the development of sophisticated manpower, but America's educational system is operationally still rooted in agrarian thinking (15).

Desperate efforts by educators to improve inner city schools, battles over integration and decentralization is only one aspect of a broader urban crisis. The ills that affect cities can be composed from the pages of any metropolitan newspaper: rising crime rates, inadequate police forces, outdated schools, polluted air and water, traffic jams. American legislators fear the cities: American intelligentia has been traditionally anti-city. The problems of the cities are also the problems of the urban schools' dilemmas and challenges (17).

The urban environment has become negative to human growth and development. Public schools could affect the behavior of the next generation leading them to rebuild negative environments such as the ghettoes, cleaning up air and water pollution, and combating disease, poverty and ignorance (24).

One method of solution sought in urban schools was the ease of the New York school and decentralization, which evolved as a result of the Bundy Report. The report claimed that the schools had become alienated from the community and suggested responsible parental participation. Community schools were set up on a trial basis, with parents involved in the planning for the trial community schools. The effort was unsuccessful, and the three pilot schools were again incorporated into the larger districts (17).

In the past several years there has developed some confusion about the role of the school. People have come to expect that the school will insure that every child in the city will be physically, mentally and emotionally fit, socially well adjusted, adapted to his environment, have proper respect for his elders, is patriotic, trained for a vocation or prepared to enter college, and knowledgable about sex and the dangers of drug abuse. The schools are also thought of by many as the builders of a new social order, but the school is only one of the agencies involved in the socialization process, together with the family, church and government (15).

CHAPTER III

DESIGN OF STUDY

The activities used included an introductory slide presentation designed to present the advantages and hazards existing in our society because of technological advances. After reviewing the presentation, students were given a self-test permitting them to rate their own knowledge of the material being used. The quiz was also used to encourage discussion at the end of the first class period. The questions on this quiz were taken from the questionnaire designed by the President's Committee on Fire Safety. On the second day an overhead transparency was used to point out the hazards of making a safe exist from a home which has begun to burn. Students were also presented with a model evacuation plan for escape, and asked to construct a plan of evacuation for escape from their own home in case of fire. A one item quiz was given on day two prior to the start of a second activity to test the achievement of the activity objective by the students. Results of this quiz are reported in Table I. On the third day the students constructed a model of a fire extinguisher, and used their model to extinguish a fire under controlled safety conditions. The students were again given a one item evaluation to test their achievement of the lesson objective. In each case the evaluation instrument used was designed to specifically test the performance objective as stated in the teacher guide materials.

TABLE I

RESULTS OBTAINED USING EVALUATION INSTRUMENT I

Number of Respondents	Number of Correct Answers	Percent of Respondents
65	54	83

Description of Subjects

Subjects used were selected ninth grade general science students in an all Black Southern urban high school. The number of students participating in the activities varied due to pre-Christmas absence. Each of the three classes used were classified as "C" track students, indicating that the students were underachievers, or have an I.Q. Score of 85 or lower. These students are typical of the target audience for which T P E materials are designed, their reading level is below grade level and they are also below grade level in arithmetic skills. T P E students are usually students classified as underachievers, either because they lack motivation or are performing below grade level in mathematical and reading skills. T P E students may also be members of minority or culturally disadvantaged groups. The Technology People Environment Program has been developed with the philosophy that these students can learn the basic concepts of engineering if using activities which do not require either extensive reading or advanced mathematical skills (12).

Data Analysis

Objective 2 of the activity "Planning for Escape" states that the "student should be able to identify criteria for an emergency fire exit from a home". On student sheet one, a model is presented for student use, showing one criterium, that each bedroom have a normal and an emergency exit.

For Evaluation Instrument I, the students were shown four models, basically the same as the model on the activity sheet, and asked to select the one that best suits the criteria for an emergency plan of escape. Only one model shows two exits, as clearly indicated. Of 65

students, 45 students were able to answer the question correctly. Refer to Table I.

Evaluation Instrument II

The students were presented the same model from which they constructed the fire extinguisher in class and proceeded to extinguish a fire. They were asked to select the criteria for burning that were illustrated by use of the fire extinguisher. In the teacher materials, stress was given to student identification of criteria and constraints. The objective clearly states that students be able to identify the criteria for burning to take place. The question was answered correctly by 41 of 60 students quizzed. Data is reported in Table II.

Summary

The students responded in a receptive manner to the presentation of the activities. Students were attentive during the introductory slide presentation. To encourage individual response to the questionnaire, the students were informed that they would not be penalized for incorrect answers. Most students answered the questions in a reasonable amount of time, and in each class discussion occurred spontaneously.

Students were able to identify with the transparency of a house that was used to identify the places where fires most often occur in a home during the night. Some students had difficulty drawing the model of the floor plan showing emergency exits, but with assistance from the teacher or another student were able to complete the task. As reported in Table I, 83% of the students were successful on the evaluation instrument for this activity.

TABLE II

RESULTS OBTAINED USING EVALUATION INSTRUMENT II

Number of Respondents	Number of Correct Answers	Percent of Respondents
60	41	68.3

There were slight disturbances during the laboratory session for Activity II. Most students were able to assemble the fire extinguisher as directed. As reported in Table II, 68.3% of the students responded correctly on the evaluation instrument.

During the three days the materials were used in the classes, discipline problems were almost non-existent. Students became involved in the activities and assisted each other readily.

Conclusion

From the results of the use of the two evaluation instruments it can be stated that underachieving students in this study only were able to achieve 75.6% success using performance based evaluation instruments. It appears that this would indicate the need for a research study to determine the value of using performance based evaluation instruments in the Technology People Environment Program.

A SELECTED BIBLIOGRAPHY

1. Ausubel, David P. The effects of environment education and enrichment on the I.Q." Education for the Disadvantaged. New York: Holt, Rinehardt, and Winston, Inc. (Ed., A. H. Passow), 1967, p. 317.

2. Caldwell, William A. How to Save Urban America. New York: Signet Books, 1973.

3. Castenado, Alfredo. The Educational Needs of Minority Groups. Lincoln, Nebraska: Professional Educators' Publications, Inc., 1974.

4. Flanagan, John C., Robert E. Mager, and William C. Shanner. Science Behavioral Objectives. Palo Alto, California: Westinghouse Learning Press, 1971.

5. Fuchs, Estelle. Pickets at the Cates. New York: The Free Press, 1966.

6. Havighorst, R. J. "Who Are The Socially Disadvantaged?" Journal of Negro Education, Vol. 33 (1964), pp. 33, 210, 217.

7. Henclay, Stephen P., James R. Yates. Futurism in Education. Berkley, California: McGutchen Publishing Corp., 1974.

8. Hewett, Frank M. Education of Exceptional Learners. Boston: Allyn and Bacon, Inc., Inc., p. 85.

9. Inlow, Gail M. The Emergent in Curriculum. New York: John Wiley & Sons, 1966, p. 90.

10. James, Richard E. "The Black Child and the School Curriculum." Journal of Negro Education, Vol. 33 (1964), p. 358.

11. Johnson, Kenneth. Teaching the Culturally Disadvantaged. Palo Alto, California: SRA, 1970.

12. Liao, T. T., E. J. Piel, and J. G. Truxal. "Technology People Environment and Activities Approach." School Science and Mathematics, Vol. I (January, 1975), p. 99.

13. Liao, T. T. "Backtalk From a Curriculum Director." The Physics Teacher, Vol. 13, No. 3 (February, 1975), p. 4.

14. Manning, Duane. A Humanistic Curriculum. New York: Harper & Rowe 1971, p. 22.

15. Marcus, Sheldon and Phillip D. Vairo. Urban Education: Crisis or Opportunity. New Jersey: The Scarecrow Press, 1972.

16. Metz, L. Daniel. Man and the Technological Society. New Jersey: Prentice Hall, 1973.

17. Miller, Harry L. and Roger R. Wook. Social Foundations of Urban Education. Illinois: Dryden Press, Inc., 1970.

18. Miller, La Mar P. "The Strengths of Black Children." Instructor, Vol. LXXXII (February, 1973), p. 24.

19. National Commission on Fire Prevention and Control. America Burning. Report to the President of the United States. Washington, D. C.: U. S. Government Printing Office, 1973.

20. National Fire Protection Association. A source for a collection of pamphlets. Massachusetts: Boston.

21. Pringle, M. L. Deprivation and Education. Longman: National Bureau for Cooperation on Child Care, 1972.

22. Reissman, Frank. The Culturally Deprived Child. New York: Harper Bros., 1962.

23. Riel, E. J. The Man Made World. New York: McGraw Hill, 1971, preface.

24. Roberts, Dennis L. II (Ed.). Planning Urban Education. New Jersey: Educational Technology Publications, 1972.

25. Roberts, Joan. School Children in the Urban Slum. New York: Free Press, 1967.

26. Russell, James D. Modular Instruction. Minneapolis: Burgess Publishing Co., 1974, p. 60.

27. Tanner, James. "Urban Crisis: Shall We Overcome?" Urban Education, Vol. VIII, No. 4 (January, 1974), p. 423.

28. Toffler, Alvin. Future Shock. Toronto: Bantam Books, 1970.

29. Truxal, John G. ECCP Newsletter. Vol. 5, No. 2 (Winter, 1974-75), pp. 1-2.

30. Watson, Goodwin. The Culturally Deprived Child. New York: Harper Bros., 1962, foreword.

31. Zinyz, Miles V. Education Across Cultures. Dubuque: Wm. Brown Book Co., 1963.

APPENDIX

MINI-COURSE ACTIVITIES

Mini-Course Rationale

The striking aspect of the nation's fire problem is the indifference with which Americans confront the subject. Destructive fire takes a huge toll in lives, injuries, and property losses, yet there is no need to accept those losses with resignation. There are many measures often very simple precautions that can be taken to reduce the losses significantly.

Americans must be further educated if danger to life, property, and natural resources is to be reduced.

The audience for whom this mini-course is designed live in the man made environment complicated by fire hazards non-existent in the natural world. Synthetics and high rise buildings are only two examples of complications caused by technological development.

The following outline is from the report of the National Commission on the Fire Prevention and Control to the President of the United States, May 4, 1973.

Criteria: To reduce fire hazards in:
1. The built environment
2. Rural wildlands environment

Constraints:
1. Building materials and design
2. Materials for furnishings and clothing
3. Increased transportation and fuel use
4. Human behavior
5. Inadequate fire fighting standards

Optimization:
1. Fire Safety Education
2. Fire Safety in Homes
3. Special provisions for the young, old, and infirm
4. Research
5. Stricter Fire codes regulated by the Government

FIRE SAFETY QUESTIONNAIRE

1. What would you do if you woke up at night, smelled smoke, found that your bedroom door was shut, but hot when you touched it?_____

_____

2. Will the clothing you have on now burn? _____

3. What would you do right now if your clothing caught fire?_____

_____

4. If you were trapped in a bedroom on the 5th floor with flames outside in the hall and smoke pouring under your door, what would you do?

_____

5. Do you have a family plan, including ways to get out of your house if the stairs and halls are blocked by fire, and a meeting place outside?_ _____

6. What should a person do if a frying pan catches on fire?_____

_____

7. What number should you dial to report a fire by telephone?_____

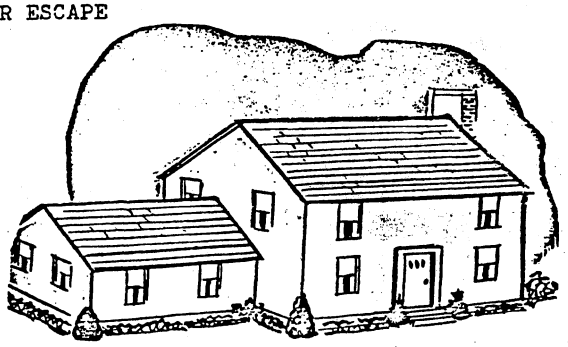
8. Should you put out an electric fire with water? _____

9. If your house began to fill up with thick black smoke, what would you do?_____

10. Assume that you plan to hang by your hands from a window ledge and then drop to the earth below. How far could you drop (feet) and still have a 50-50 chance of survival without serious injury?_____

NAME_____

PLANNING FOR ESCAPE

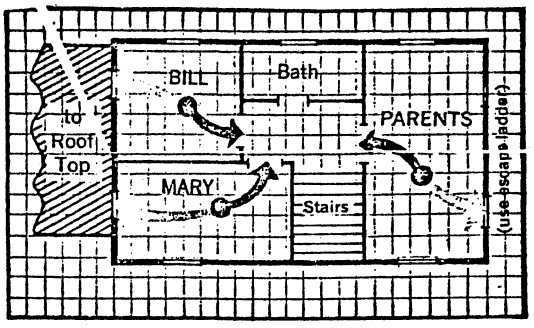


Use the following directions to make a floor plan for ground or upper story rooms with TWO ESCAPE ROUTES:

1. Floor layout (measurements and details not necessary)
   Make an outline of the entire floor area.
   Add each bedroom and label it.
   Locate windows, doors, and stairway as shown in the example.

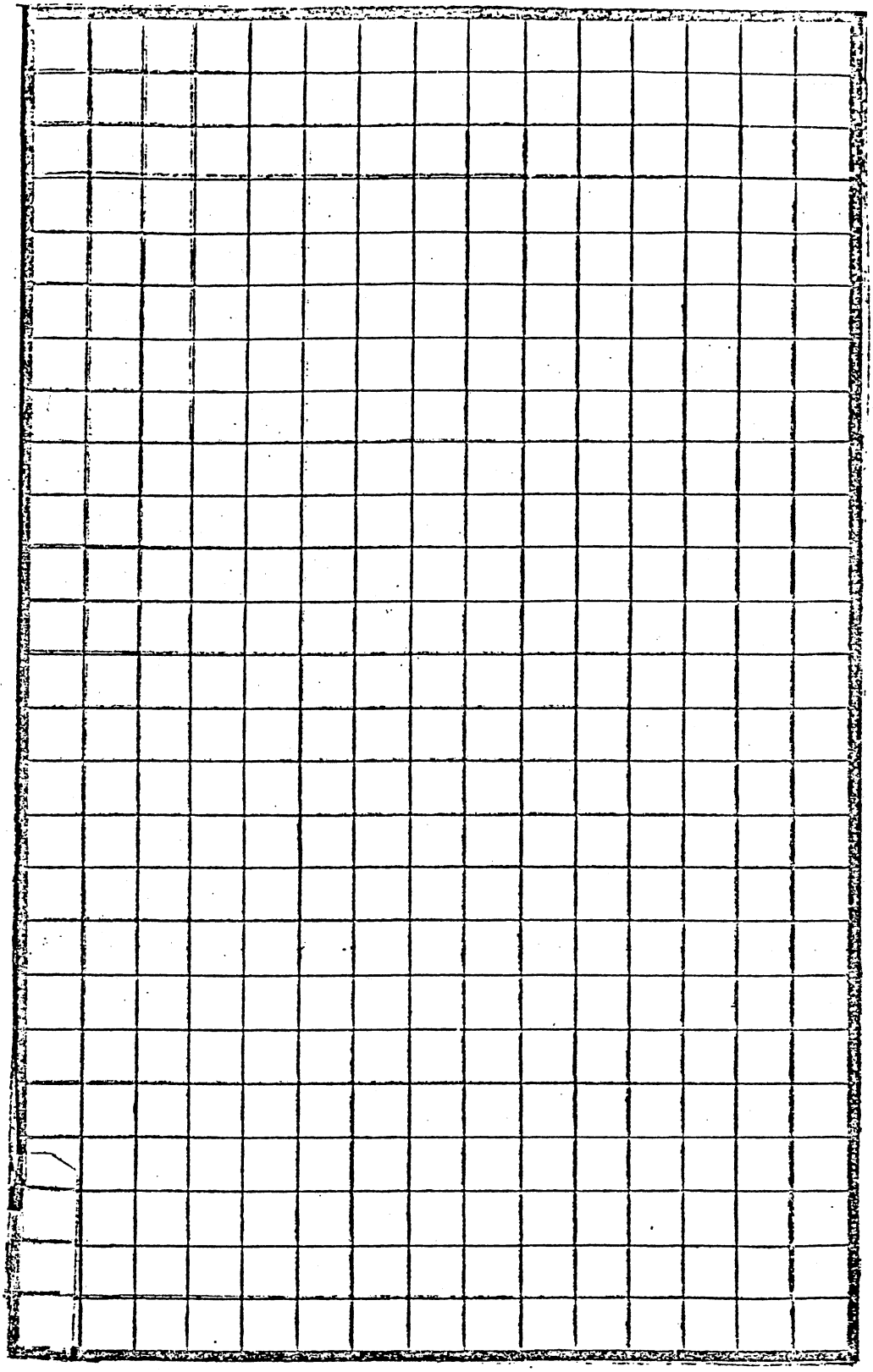
2. Inspect each room
   Go to each bedroom and select the best window for EMERGENCY EXIT
   Check that the window, screen, and/or storm sash work easily, and are large, and low enough to use.

3. Complete your plan.
   Draw black arrows to show normal exit.
   Draw colored arrows to show <u>emergency exit</u> in case fire blocks hallways or stairs.



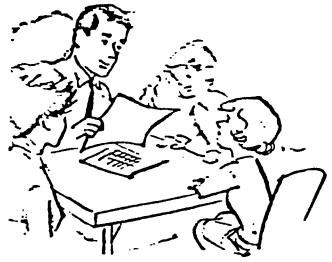
Be sure everyone has an emergency escape route. If necessary consider installing an escape ladder, rearranging bedrooms, making doorways through bedrooms to provide additional exit routes.

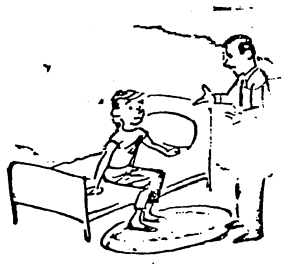
NAME _____



NAME _____

PLANNING FOR ESCAPE





In the space provided below list the criteria used to design your model.

_____

_____

_____

_____

In the space provided below list the constraints you encounted when designing your model.

_____

_____

_____

_____

In the space provided below write a paragraph describing how you optimized, that is, how you did the best job possible under the conditions you had to work with.

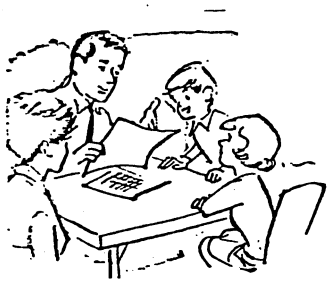
_____

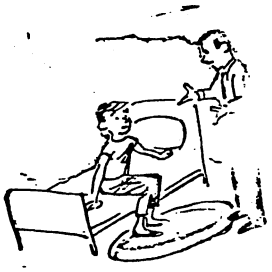
_____

_____

_____

PLANNING FOR ESCAPE - CONDUCTING YOUR FAMILY FIRE DRILL

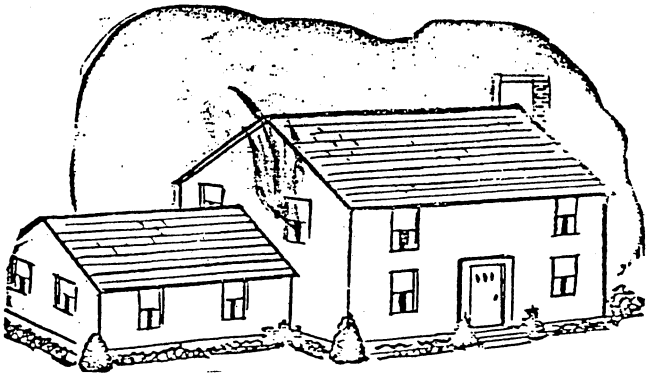




HAVE EVERYONE IN THE FAMILY PREPARED TO TAKE PART IN YOUR PRACTICE DRILL..

1. Each family member should be in his or her bedroom - doors shut.
2. Sound the alarm, it might be of assistance to have a child do this.
3. Each family member should respond to the alarm - out of bed and to the door. You may want to pretend that normal exits are blocked by fire and at least try to open windows and screens to be sure all is in working order. DO NOT GO ON ROOFTOPS OR CLIMB OUT OF windows in a practice drill.
4. Everyone gather at the prearranged meeting place - all there?
5. Notify fire department - rehearse procedure, do not actually place a call.
6. Give assistance to infants or elderly.

WARNING : IF CAUGHT IN SMOKE AND HEAT KEEP LOW, heat rises, so air will be cooler closer to the floor.Take short breaths, cover face with a cloth.



PLANNING FOR ESCAPE - FIRE ESCAPE INFORMATION

This information will help you to plan a fire drill for your family. Follow the instructions carefully. Explain the following procedures to your family.

1. Always sleep with your bedroom or hall door closed. This can keep the fire out long enough to permit escape through your emergency escape route.

2. Decide on a family fire alarm. Remember that you need something loud, for a family member may be behind a closed door. You may select a loud whistle, or decide to bang on a pan. Be sure that whatever signal you select, your family would always know it meant fire.

3. Don't waste time gathering valuables or getting dressed - in a fire seconds count.

4. Test doors before opening as shown in the diagram below. Intense heat and deadly smoke may be on the other side of the door. If a door feels hot, or if smoke is leaking in around the edges do not open the door.

HOW TO "TEST" A DOOR:
Are door panels hot? Is smoke leaking in around edges? If you suspect fire on other side, DON'T OPEN THE DOOR. But, if you think it's safe — open it cautiously.

HOW TO "OPEN" A DOOR:
Brace shoulder against door. Keep head to one side. Open door slightly . . . ready to slam it if any heat and smoke rush in.

5. Have an outside meeting place to see if everyone is out safe. Once out stay out.

6. The house phone may be out of order due to burned wires, plan to use a neighbor's phone or nearby alarm box.

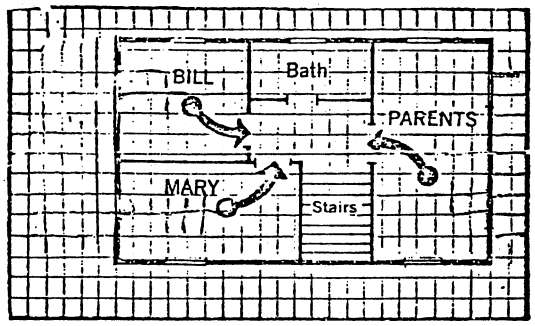
7. Notify the fire department quickly - use the following sample:

Speak slowly and plainly. Say, " My name is ..... I want to report a fire at ....." WAIT on the phone to answer any questions. DO NOT HANG UP FIRST.

NAME _____

PLAN YOUR ESCAPE - EVALUATION

Select the diagram which best demonstrates the criteria for a plan of escape in case of fire.



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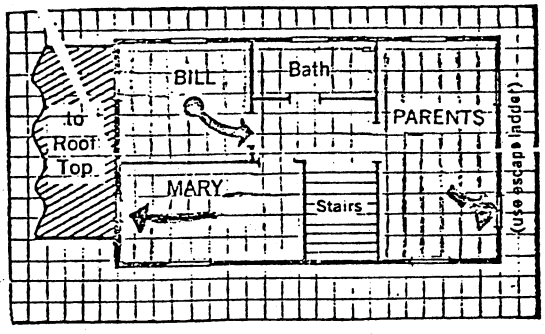

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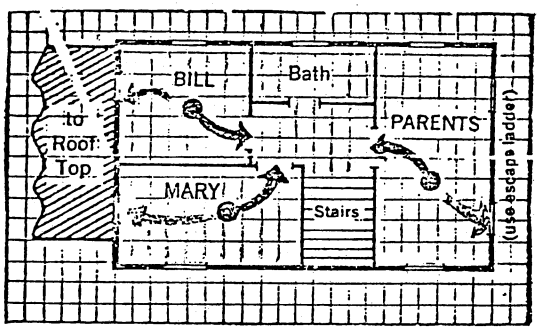

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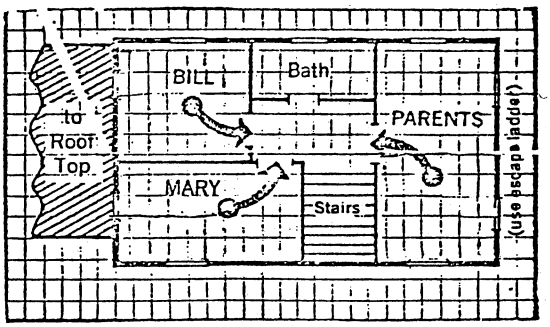

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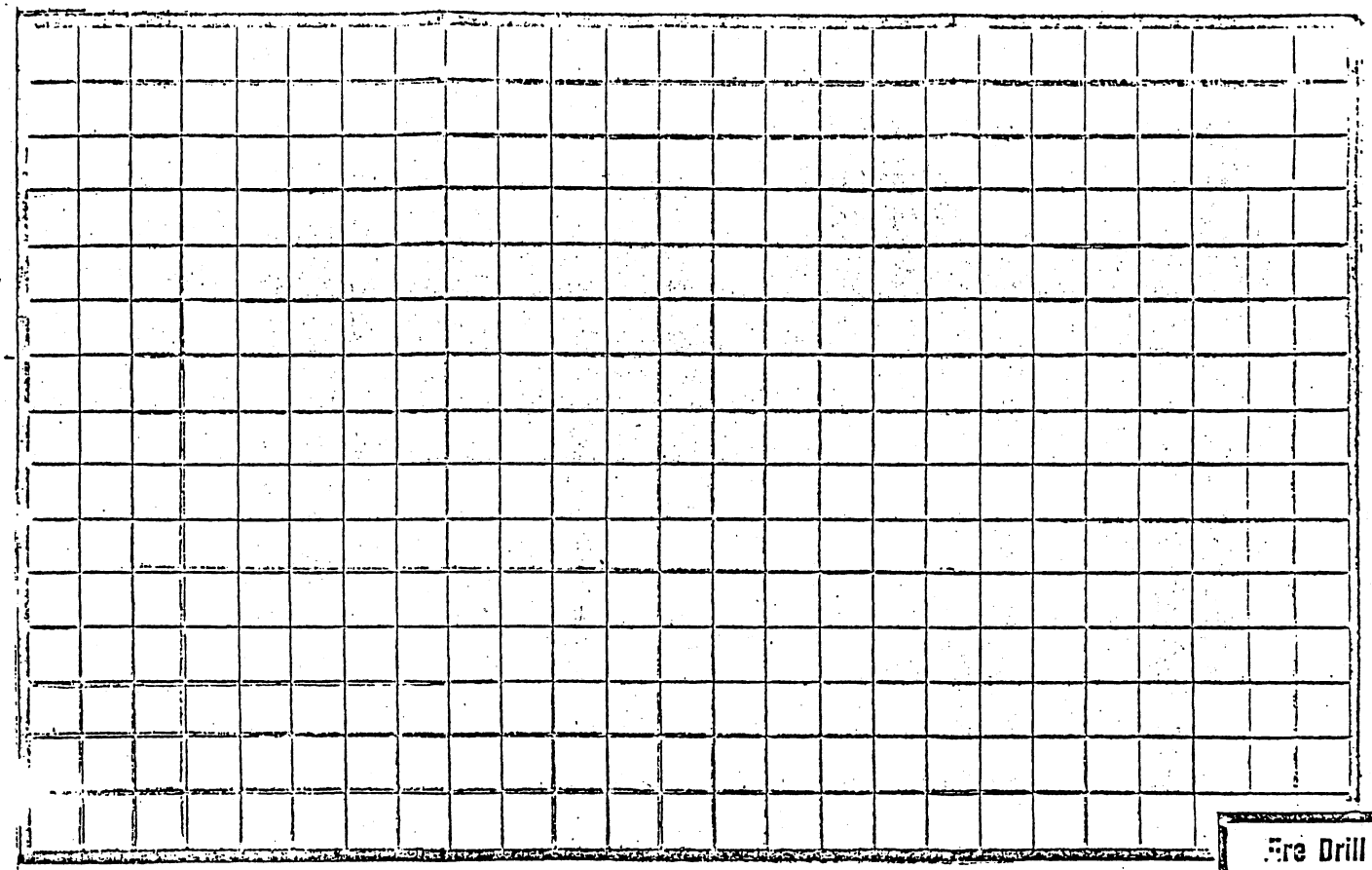


FIRE ESCAPE INFORMATION

How to sound family fire alarm .....

Outside meeting place .....

Special Assignment:

(Name) ..... notifies Fire Department by phone

— using neighbor's phone (name) .....

Fire Department phone number .....

OR — use street alarm box (location) .....

Special Duties (help elderly, raise outside ladder, etc.):

Duty .....

..... (name) .....

Duty .....

..... (name) .....

Special Instructions .....

.....

Fire Drill Schedule

(every 6 months)

Date .....

Date .....

Date .....

Date .....

Date .....

TEACHER GUIDE MATERIAL FOR ACTIVITY
Planning for Escape

Umbrella Ideas

1. Many deaths are caused as a result of residential fires which occur during the hours when the family is normally asleep.

2. Having a pre-planned escape from the home in case an emergency occurs could prevent the loss of life.

Objectives

1. On the graph paper provided, the student should construct an approximate model of the floor plan of his or her home showing at least two possible exits from each bedroom.

2. The student should be able to identify criteria for an emergency fire exit plan from a home.

3. The student should be able to list constraints which might prevent the design of an ideal plan for his or her home.

4. The student should be able to suggest ways to optimize if an ideal plan is not possible.

Materials: 6 student sheets (2 required, 4 optional)
overhead projector
transparency

References: National Fire Protection Association
60 Battery March Street
Boston, MA 02110

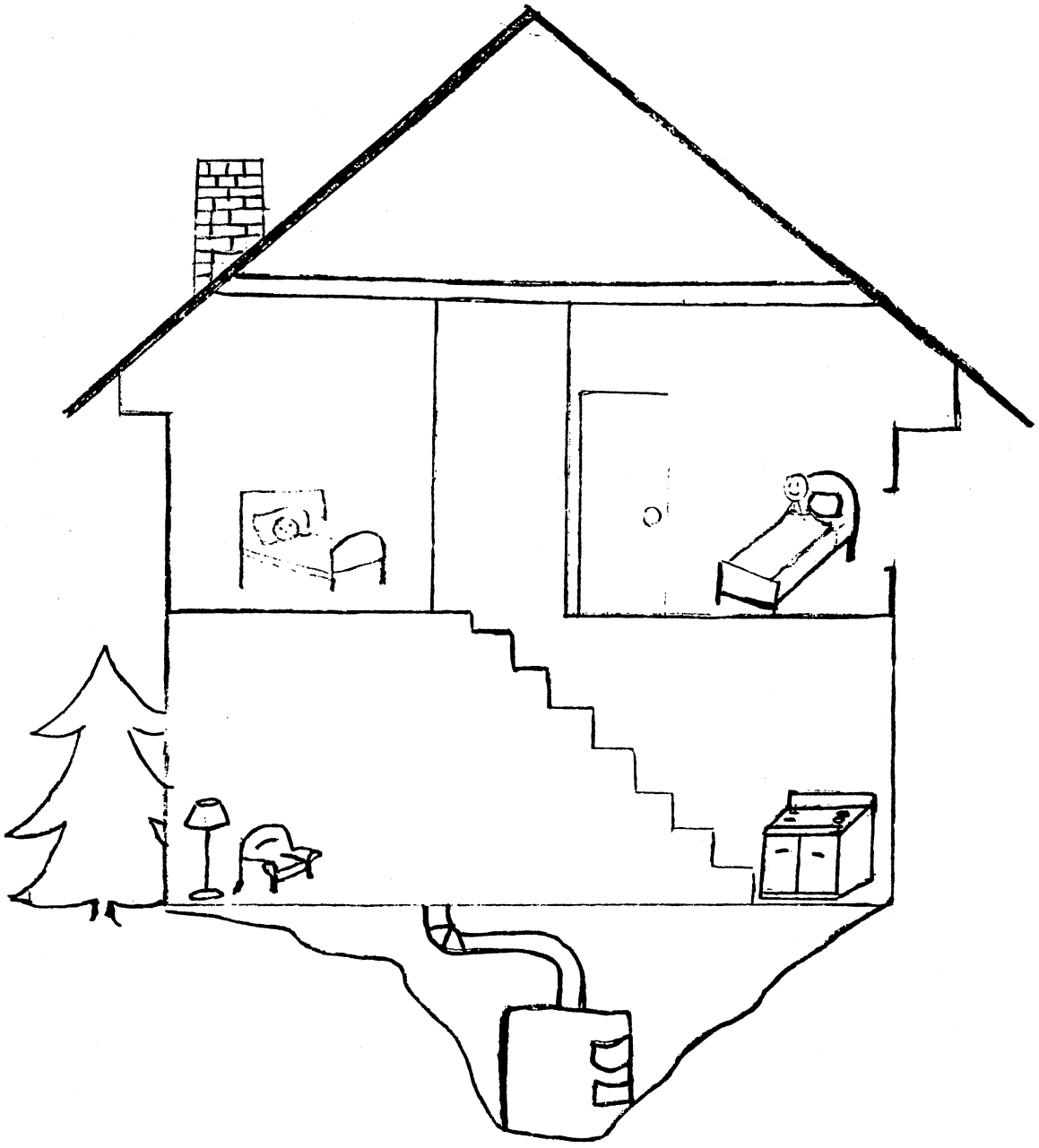
National Commission on Fire Prevention and Control
1730 K Street, N.W.
Washington, DC 20006

Extensions:

1. Refer to pages 3-6 of activity.

2. Have the students plan a fire drill for the school and suggest means of optimizing the plan after the drill is completed.

3. Use this as an opportunity to discuss the difficulty in evacuating high rise buildings. The transparency can be reused to demonstrate how hallways become blocked by fire and smoke complicating exit procedures.

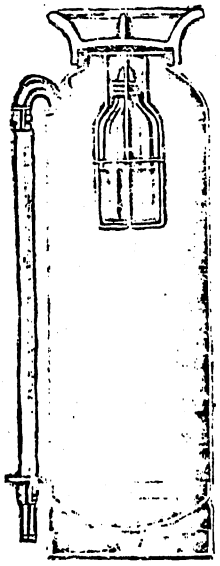


TRANSPARENCY

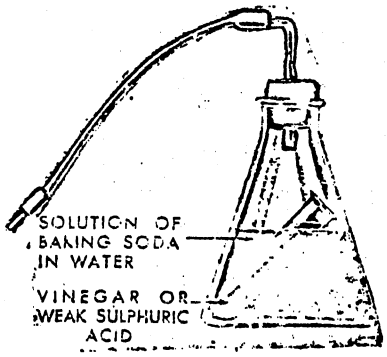
NAME:_____
DATE:_____

PUT IT OUT

One important criteria for fire control is to be able to put a fire out quickly if one starts, so it cannot spread.Shown below is a picture of a portable fire extinguisher that you may have seen in school or even in your home. The picture shows the inside of the fire extinguisher.Compare that picture with the one on the right.List ways the two diagrams are alike.



CARBON DIOXIDE EXTINGUISHER



HOMEMADE EXTINGUISHER

_____

_____

_____

The diagram, represents a fire extinguisher that you will mak in class today.Follow the directions, and be careful handling the equipment.

1.Fill the flask half way with the solution of baking soda and water provided by your teacher.
2. Assemble the top of the apparatus. Be sure that your apparatus is the same as the one pictured in the diagram.
3.Fill the test tube to the indicated mark with vinegar or weak sulfuric acid.Be sure not to spill any of the test tube contents into the solution of baking soda in the flask.

With your teacher's assistance, light a fire with a small piece of paper in a water trough.Hold the nozzle of your fire extinguisher securely, then turn the flask upside down allowing the two solutions to mix.Extinguish the fire you started with the paper.

In order to continue burning your fire needed oxygen.Your extinguisher furnished Carbon dioxide, and the fire stopped burning because there was no longer the supply of oxygen for burning to take place.

NAME _____

EValuation - Put It Out

In class you made a fire extinguisher like the one pictured in the diagram.Next, you started a fire with paper and put it out using your fire extinguisher.

The fuel in this experiment was _____

The substance burned was _____

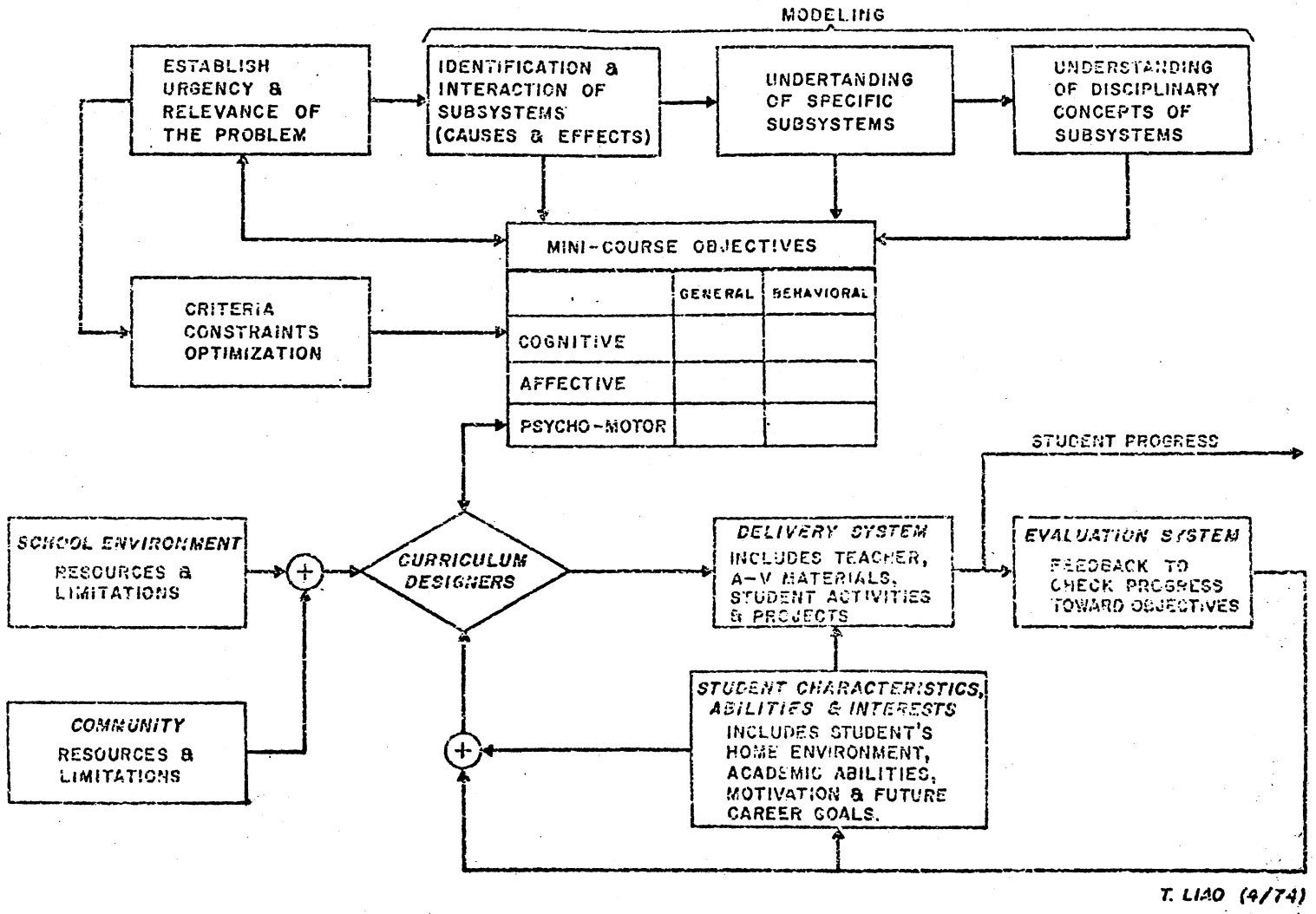
Heat energy was supplied in the form of_____

Now that you recognize the criteria for burning to take place,at least in this example, you can see that one method of fire control is to eliminate at least one of the necessary criteria for burning to take place.

Draw a circle around the word which represents the criteria for burning that was eliminated by the use of your fire extinguisher.

OXYGEN COMBUSTABLE SUBSTANCE HEAT ENERGY

A MODEL FOR DESIGN OF PROBLEM-CENTERED MINI-COURSES



VITA

Marilyn Durr Deal

Candidate for the Degree of

Master of Science

Thesis: THE DEVELOPMENT AND TRIAL OF A TECHNOLOGY PEOPLE ENVIRONMENT MODULE WITH SELECTED 9th GRADE STUDENTS

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Professional Experience: Histology technician, Louisiana State University Medical School, 1956; Junior and Senior High School physical education, social studies, mathematics and science teacher, New Orleans, Louisiana, public schools, 1964-1974; Research Assistant, State University of New York at Stony Brook, 1974; Graduate Research Assistant, Oklahoma State University, Department of Curriculum and Instruction, 1974-1975.